11-02-00

A

Patent Application
Docket No. 34650-657PT

23932
PATENT TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: Magnus Tillgren, Magnus Hollström, and Patrik Olsson

For: METHOD AND SYSTEM FOR CONTROLLING AN ELECTRONIC UTILITY DEVICE USING AND ELECTRONIC READING DEVICE

BOX PATENT APPLICATION
Assistant Commissioner
for Patents
Washington, D.C. 20231

CERTIFICATE OF MAILING BY EXPRESS MAIL

"EXPRESS MAIL" Mailing Label No. EL 524 961 681 US

Date of Deposit: October 31, 2000
I hereby certify that this paper or fee is being deposited with the U.S. Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Type or ~~Print Name~~: Carolyn Bova

Carolyn Bova
Signature

Sir:

PATENT APPLICATION TRANSMITTAL LETTER

Transmitted herewith for filing, please find the following:

X Specification, claims and abstract of the above-referenced patent application (total of 61 pages)

X 8 sheet(s) of drawing(s) (__formal/ __informal).

X Combined Declaration and Power of Attorney (unexecuted).

___ An Assignment of the invention to: Telefonaktiebolaget LM Ericsson (publ)

___ A verified statement claiming small entity status under 37 CFR 1.9 and 1.27.

X Other (specify): Acknowledgment postcard.

___ This application is a:

__ Continuation
__ Divisional
__ Continuation-In-Part

of prior copending parent application Serial No. _____ filed on _____ now pending.

Please amend the application to insert the following line in the beginning of the specification:

--This application is a Continuation of prior application Serial No. _____ filed on _____, now pending.--

In the event that a petition to extend time under 37 CFR 1.136 is necessary in the parent application to maintain copendency for this application, a petition for an extension of the necessary time to maintain copendency is hereby requested for the parent application and the Commissioner is hereby authorized to debit our Account Number 10-0447 for the necessary fees.

The filing fee has been calculated as shown below:

	NO. FILED	NO. EXTRA	RATE	FEE
BASIC FEE				**$710**
TOTAL CLAIMS	**29-20**	**9**	**$18**	**162**
INDEPENDENT CLAIMS	**3-3**	**9**	**$80**	**0**
MULTIPLE DEPENDENT CLAIM(S) PRESENTED			**$260**	
TOTAL FEES:				**$872**
Deduct one-half of fee for Small Entity				**-**
ASSIGNMENT RECORDAL FEE			**$40**	
TOTAL AMOUNT DUE:				**$872**

___ Please charge my Deposit Account No. 10-0447 in the amount of $_____

___ Check(s) in the amount of $_____ is/are attached. Please charge any deficiency or credit any overpayment to Deposit Account No. 10-0447 .

___ The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to Deposit Account No. 10-0447.

___ Any patent application processing fees under 37 CFR 1.17 and under 37 CFR 1.20(d).

___ The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).

___ Any filing fees under 37 CFR 1.16 including fees for presentation of extra claims.

Spencer C. Patterson
Registration No. 43,849

JENKENS & GILCHRIST,
a Professional Corporation
3200 Fountain Place
1445 Ross Avenue
Dallas, Texas 75202-2799
214/855-4177 (Direct)
214/855-4300 (Fax)

Patent Application
Docket# 34650-657PT

CERTIFICATE OF MAILING BY EXPRESS MAIL

"EXPRESS MAIL" Mailing Label No.
EL 524 961 681 US . . . . 31 . . . . . .
Date of Deposit October 31, 2000 .
I hereby certify that this paper or fee is being deposited with the U.S. Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Box Patent Application, Washington, D.C. 20231

Type or Print Name Carolyn Bova . . . .

. . Carolyn Bova . . . . . .
Signature

METHOD AND SYSTEM FOR CONTROLLING AN ELECTRONIC UTILITY DEVICE USING AN ELECTRONIC READING DEVICE

REFERENCE TO EARLIER FILED PROVISIONAL APPLICATIONS

This patent application claims the benefit of priority from, and incorporates by reference the entire disclosure of, co-pending U.S. Provisional Patent Application Serial Nos. 60/182,742, filed on February 16, 2000, 60/190,343, filed on March 16, 2000, and 60/192,662, filed on March 28, 2000.

CROSS REFERENCE TO RELATED APPLICATION

The present application for patent is related to and hereby incorporates by reference the subject matter disclosed in U.S. Patent Application Serial Nos.

_____ (Attorney Docket No.34650-566PT), entitled "Specially Formatted Paper Based Applications of a Mobile Phone"; _____ (Attorney Docket No.34650-569PT), entitled "Method and System for Using an Electronic Reading Device as a General Application Input and Navigation Interface"; _____ (Attorney Docket No.34650-578PT), entitled "Predefined Electronic Pen Applications in Specially Formatted Paper"; _____ (Attorney Docket No. 34650-579PT), entitled "A System and Method for Operating an Electronic Reading Device User Interface"; _____ (Attorney Docket No. 34650-601PT), entitled "Method and System for Using an Electronic Reading Device on Non-paper Devices"; _____ (Attorney Docket No. 34650-602PT), entitled "Multi-layer Reading Device"; _____ (Attorney Docket No. 34650-604PT), entitled, "Method and System for Configuring and Unlocking an Electronic Reading Device"; _____ (Attorney Docket No. 34650-606PT), entitled "Printer Pen"; _____ (Attorney Docket No. 34650-607PT), entitled "Method and System for Electronically Recording Transactions and Performing Security Function";

_____ (Attorney Docket No. 34650-608PT), entitled "Electronic Pen with Ink On/ink off Function and Paper Touch Sensing"; _____ (Attorney Docket No. 34650-654PT), entitled "Method and System for Handling FIFO and Position Data in Connection with an Electronic Reading Device"; _____ (Attorney Docket No. 34650-655PT), entitled "Hyperlink Applications for an Electronic Reading Device"; _____ (Attorney Docket No. 34650-656PT), entitled "Measuring Applications for an Electronic Reading Device"; and _____ (Attorney Docket No. 34650-658PT), entitled "Positioning Applications for an Electronic Reading Device"; and _____ (Attorney Docket No.34650-673PT), entitled "Method for Sharing Information Between Electronic Reading Devices"; and in U.S. Provisional Patent Application Serial Nos. _____ (Attorney Docket No.34650-671PL), entitled "Electronic Pen for E-Commerce Implementations"; and _____ (Attorney Docket No.34650-672PL), entitled "Electronic Pen Help Feedback and Information Retrieval"; all filed concurrently herewith.

BACKGROUND OF THE INVENTION

Technical Field of the Invention

The present invention relates in general to the communications field, and in particular to an interaction of an electronic reading device with an address pattern.

Description of Related Art

Numerous devices exist for accepting user input and controlling user interaction with desktop and portable computers, personal digital assistance (PDAs), mobile phones, and other types of electronic devices. For example, a keyboard can be used to accept typed input and other types of commands, a mouse or a track-ball can be used to provide relative motion input as well as various types of point-and-click selections, a keypad can be used to provide input of numerical data and functional commands, navigational keys can be used for scrolling lists or otherwise repositioning a cursor, and various types of touchpads or touchscreens can be used to provide absolute positional coordinate inputs. Each type of mechanism for accepting input and for supporting user interaction has benefits and disadvantages in terms of

size, convenience, flexibility, responsiveness, and easy of use. Generally, the selection of a particular type of input mechanism is dependent upon the function of the application and the degree and type of interaction required.

With the ever expanding capabilities and availability of applications both on the Internet and the area of wireless technology, there continues to be a need to develop and provide new mechanisms for accepting input and interacting with users. In particular, some of the existing technologies suffer from drawbacks or limitations, such as size and flexibility, that make them impractical and/or inconvenient to use in some situations. By expanding the range of mechanisms for supporting user interaction, application developers and end-users can have greater flexibility in the selection of input devices. Preferably, any such new mechanisms will provide increased flexibility and will maximize user convenience. In addition, the development of new mechanisms for interacting with users can expand the realm of potential applications.

For example, while a keyboard typically provides a great deal of flexibility, particularly when it is used in connection with a mouse, a touchscreen, or other navigational device, its size makes it inconvenient in many cases, especially in the wireless context.

SUMMARY OF THE INVENTION

The present invention comprises a method and system for controlling electronic utility devices. The method and system utilize an electronic reading device that includes a sensor for detecting portions of an address pattern on a specially formatted surface. In particular, the surface is formatted for use in controlling a specific electronic utility device and includes an address pattern from which a position on the address pattern can be determined by detecting a small portion of the address pattern. Thus, using the portion of the address pattern detected by the electronic reading device, a position or positions of the electronic reading device relative to the address pattern can be determined. The position or positions can then be converted into a control message, which is sent to a server associated with the specific

electronic utility device for use in controlling, accessing, or operating the utility device.

Preferably, instructions for translating detected positions into control messages are downloaded to a processor or wireless application protocol (WAP) browser. In performing the translation, the processor or WAP browser identifies a uniform resource locator (URL) associated with the detected portion of the address pattern and generates common gateway interface (CGI) calls that correspond to information entered, selected, or written with the electronic reading device. Once the processor or WAP browser performs this translation, the control message, which contains the CGI calls, is sent via a Bluetooth™ radio interface to a WAP server at the identified URL. The WAP server then directs the specific electronic utility device to perform the requested functions specified in the control message.

In one embodiment of the invention, the processor or WAP browser is contained within the electronic reading device. In an alternative embodiment, the processor or WAP browser is contained in a separate electronic device, such as a mobile station. In either case, communications

between the electronic reading device, the separate electronic device, and the WAP server are preferably conducted via a Bluetooth™ radio interface.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a block diagram of a system in which an electronic pen can be used as an input device;

FIGURE 2 is a schematic diagram of a system for supporting use of the electronic pen described in connection with FIGURE 1;

FIGURE 3 is an illustration of the protocol stacks that can be used in the case of local communications between an electronic pen and an electronic pen client;

FIGURE 4 is an illustration of protocol stacks that can be used when an electronic pen and an electronic pen client communicate with one another via an Internet connection;

FIGURE 5 is an illustration of a protocol stack for communications between an electronic pen client and each of the supporting entities when the electronic pen client is not located within a server on the Internet;

FIGURE 6 is an illustration of protocol stacks that are used for communications between an electronic pen client and each of the supporting entities when the electronic pen client is located on the Internet;

FIGURE 7 is a block diagram of the electronic pen logic that handles positions, strokes, actions, and grid descriptions;

FIGURE 8 is a block diagram of a state machine for the electronic pen control block shown in FIGURE 7;

FIGURE 9 is a block diagram of a state machine for an electronic pen client;

FIGURES 10A-10C are a message flow and signaling diagram illustrating the operation of the electronic pen system shown and discussed in connection with FIGURE 2; and

FIGURE 11 is a schematic diagram of a control system in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a system in which an electronic reading device, such as an electronic pen, an electronic mouse, or a hand scanner, works in cooperation with an address pattern (e.g., a specially formatted paper) to provide for a detection of a location of the electronic reading device over the address pattern. For instance, a pattern of dots can be defined such that, by examining a very small portion of the pattern, a precise location in the overall pattern can be determined. In fact, it is possible to define a pattern that has the size of 73,000,000,000,000 A4 pages, which is equivalent to half the size of the entire United States. Portions of the pattern can be placed on sheets of paper or other objects.

Then, using an electronic scanner pen that can detect the dots in the pattern, it is possible to detect the location of the pen with respect to the unique pattern. For example, when such a pen is used in connection with a specially formatted paper, the pen can detect its position (e.g., using a built in camera) by detecting a 3 mm by 3 mm portion of the pattern. By taking approximately 100 pictures per second, the pen is capable of determining its

exact position to within 0.1 mm or less. This system can be used to provide user input, to facilitate user interaction, or to store handwritten notes or drawings. Moreover, by associating portions of the overall pattern with certain applications, such a system can be used to interact with wide variety of applications.

Referring now to FIGURE 1, there is illustrated an example of a system 2 in which an electronic pen 10 can be used as an input device. The electronic pen 10 includes an ink cartridge and is capable of writing in a typical fashion. The electronic pen 10, however, includes some type of sensor (e.g., a built-in camera) that is used for detecting an address pattern on a specially formatted piece of paper 12. In particular, the paper 12 is formatted with a small portion of a large address pattern such that when the electronic pen 10 is used to write on or otherwise make marks on the paper 12, the writings or markings can be electronically detected and stored.

As an example, the paper 12 might constitute a form that can be used for sending an email. Thus, the paper 12 might include a space for writing in the email address of an intended recipient, a space for writing a subject of

the email, and a space for writing the body of the email. As the electronic pen 10 is used to fill in each of the spaces, the position and movement of the electronic pen 10 on the paper 12 can be determined by repeatedly detecting the current x, y coordinates of the pen 10 (e.g., at rate of 100 frames per second). The markings can then be converted into ASCII text using an appropriate handwriting recognition program. Once the user completes the form, the email can be sent, for example, by checking a send box at a predetermined location on the paper 12.

Preferably, the coordinate information collected by the pen 10 is sent by a short range radio transmitter in the electronic pen 10 to a nearby mobile station 14 using a short range radio interface 16 such as a local wireless radio link (e.g., a local wireless radio link supported by Ericsson's Bluetooth™ wireless communications technology). Alternatively, instead of using a mobile station 14, the coordinate information could also be sent to, for instance, a desktop or portable computer, a personal digital assistant (PDA), a television, or a Bluetooth terminal. Moreover, instead of using a local wireless radio link, other types of local wireless links, such as

inductive coupling and infrared light; other types of radio links, such as Global System for Mobile Communication (GSM); or wired transmission media, such as a cable can also be used. The information can then be forwarded via an appropriate link, such as a cellular air interface 18, to a base station 20 or other network node.

Referring now to FIGURE 2, there is illustrated a schematic diagram of a system 2 for supporting use of the electronic pen 10 described in connection with FIGURE 1. Throughout the subsequent discussion, the system 2 is described primarily in connection with an electronic pen 10. It will be understood, however, that the invention and the underlying system 2 can instead use any type of electronic reading device, such as an electronic pen, an electronic mouse, or a hand scanner. As shown in FIGURE 2, the system 2 includes six different entities, including the electronic pen 10, electronic pen client 22, a control node 24, a name server 26, a base translator 28, and an application server 30. Although these various devices are described and depicted separately, it is also possible to combine two or more of the entities into the same device

(e.g., the electronic pen 10 and electronic pen client 22 can be contained in the same device).

The electronic pen 10 is responsible for detecting positions on the address pattern, producing actions, and sending information to the electronic pen client 22. In addition to being able to leave pen markings, some electronic pens can also have the ability to produce other types of output, such as sound, vibration, or flashing lights. The electronic pen 10 includes a memory for storing a current grid, which comprises information relating to an area of the address pattern that is near the most recently detected position of the electronic pen 10. When the electronic pen 10 is loaded with the current grid, it knows what actions to take based on the positions that are read from the address pattern. When the electronic pen 10 is first turned on or when it moves to an area outside of the current grid, the electronic pen 10 must first request a new grid description before it can continue processing information. In such a situation, the electronic pen 10 requests a new grid description from the electronic pen client 22.

The electronic pen client 22 can be located in a mobile station 14, in a PDA, in a desktop or portable computer, in the electronic pen 10 itself, in a server somewhere on the Internet, or in another device. The electronic pen client 22 serves as the center of communications in the overall system 2. In particular, the electronic pen client 22 receives new grid requests and action requests from the electronic pen 10 and responds to these requests by contacting an appropriate entity within the overall system 2 to properly respond to the request from the electronic pen 10. Furthermore, when the electronic pen 10 is being used in connection with a particular application, the electronic pen client 22 can store the application and/or any corresponding data received from the electronic pen 10 to facilitate processing and use of the application.

The name server 26 is used for translating a detected position on the address pattern into a Uniform Resource Location (URL) associated with that position. Different portions of the address pattern are assigned to different applications. Neither the electronic pen 10 nor the electronic pen client 22, however, is aware of all of the

different applications and the particular areas assigned to each application. Thus, when the electronic pen 10 detects a new or unknown position, it forwards the position information to the electronic pen client 22, which in turn sends the information to the name server 26. The name server 26 then identifies an application associated with the received position and retrieves a URL where a description of the particular application can be found. The retrieved URL can then be used by the electronic pen client 22 to retrieve the application description.

As an alternative, the name server 26 can comprise a global name server that keeps track of a location, in the form of URLs to local name servers, where more information can be found about different addresses in the pattern. Similarly, each local name server can use other local name servers to obtain the necessary information, i.e., to convert a position into a URL where an application description can be found. At the lowest level, the local electronic pen client should know all the paper addresses that are within a specific application or applications.

There are some services that should be available in the overall system 2 for which it is inconvenient or not feasible to support such services in the electronic pen 10 or the electronic pen client 22. In such a case, the base translator 28 can be used to support the services. For example, the base translator 28 might contain handwriting recognition software for converting pen actions into text or for converting pen actions into a predefined set of symbols. When such services are needed, the electronic pen client 22 can send a request to the base translator 28 along with the necessary data, and the base translator 28 can perform the requested service.

Another entity in the system 2 is a control node 24. The control node 24 is used for responding to actions in a standardized way. For example, the control node 24 can be used to respond to certain generic functions, such as "cancel" or "submit" functions, in a consistent manner without regard to the particular application that is currently active.

In addition, the control node 24 is used for creating streaming-like applications. For instance, some applications might require that the positions on the

address pattern that are detected by the electronic pen 10 be immediately sent, upon detection, to the electronic pen client 22 for use by the application (i.e., the electronic pen 10 does not wait to transmit the position data until a complete stroke is detected or until a "send" field is touched). One example is an application that is used to control an industrial robot in a warehouse. In such a case, the application description that is loaded onto the electronic pen server 22 can include instructions that all positions be streamed to a control node 24. As a result, the control node 24 can receive the positions in real time and can control the robot without waiting for the form (i.e., the current grid) to be completed. Thus, the control node 24 can perform a real-time translation from detected positions to a responsive action, such as moving an object (e.g., a robot, a valve, etc.) or controlling a process.

The application server 30 is a regular web or wireless application protocol (WAP) server that supports an application associated with a particular area of the address pattern. The application server 30 stores an application description and provides the application

description to the electronic pen client 22 upon request. In addition, the application server 30 receives input data from the electronic pen 10 via the electronic pen client 22. For example, the application description might define a number of data entry areas on a form. Thus when data is entered on the form by the electronic pen 10, the data is received by the electronic pen client 22, converted into text using handwriting recognition software, and forwarded to the application server 30, which stores the data or otherwise processes the data in accordance with the function of the application.

Referring now to FIGURES 3 through 6 there are illustrated various examples of protocol stacks that can be used for communicating between the entities shown in FIGURE 2. Generally, however, such protocols apply however, only if the two communicating entities are implemented in different devices. If two or more entities are combined into one device, a proprietary protocol can be used to communicate between the entities. FIGURE 3 illustrates the protocol stacks that can be used in the case of local communications (e.g., using Bluetooth) between the electronic pen 10 and the electronic pen

client 22. If, on the other hand, the electronic pen 10 and the electronic pen client 22 communicate with one another via an Internet connection, the protocol stacks depicted in FIGURE 4 will be used. FIGURE 5 illustrates a protocol stack for communicating between the electronic pen client and each of the supporting entities, such as the name server 26, the control node 24, the base translator 28, and the application server 30, when the electronic pen client 22 is not contained within a server on the Internet (e.g., such as when the electronic pen client 22 is located in a mobile phone 14). Finally, FIGURE 6 depicts the protocol stacks that are used when the electronic pen client 22 is located on the Internet.

There are a number of procedures that can be used by the various entities in the system 2 to allow the system to operate properly. When the electronic pen 10 detects a position on the address pattern that is not within its currently loaded grid or when the electronic pen 10 has no currently loaded grid, the electronic pen 10 initiates a new grid procedure. The new grid procedure involves sending a new grid request object to the electronic pen client 22. The new grid request object contains the newly

detected position, a description of the actions that the electronic pen 10 can natively support, and a description of the output signals that the electronic pen 10 supports. The reply to a new grid request object is a grid description, which can be provided by the electronic pen client 22 from its own internal memory or from the information provided by an application server 30. Generally, the electronic pen client 22 extracts the grid description from an application description received from the application server 30. The grid description should only contain action-field-types that the electronic pen 10 has indicated that it natively supports, which means that the electronic pen client 22 in some cases should convert the extracted grid description into a format that the electronic pen 10 can understand.

In some situations, it may be necessary for the electronic pen 10 to unload its current grid at the request of the electronic pen client 22. In such a case, the electronic pen client 22 sends an empty grid description to the electronic pen 10, thereby causing the electronic pen 10 to unload its current grid. This can occur, for example, when a particular application is

complete or when a new grid description request received from the electronic pen 10 cannot be fulfilled, such as when the position received from the electronic pen 10 is not registered in the name server 26.

Another similar message is the empty grid description with a grid exception. When the electronic pen 10 requests a new grid description from the electronic pen client 22, the electronic pen client 22 uses the detected position specified in the request to ask the name server 26 for a URL where the application description can be found. If no URL is returned, the electronic pen client 22 can send an empty grid description with a grid exception to the electronic pen 10. The grid exception comprises a rectangle or other shape indicating the area around the detected position where no registered applications can be found. Preferably, the indicated area is as large as possible so that the electronic pen 10 and/or electronic pen client 22 know the extent of the surrounding area that is unassigned and do not have to repeatedly send requests to the name server 26. Thus, the empty grid description with a grid exception causes the electronic pen 10 to unload its current grid and also

informs the electronic pen 10 of an area surrounding the detected position that can essentially be ignored because its is not associated with any application.

The procedure that is used when the electronic pen 10 detects a new position is a find application description location procedure. This procedure is used by the electronic pen client 22 to translate a detected position received from the electronic pen 10 into a URL where a description of an application corresponding to that position can be found. The procedure involves sending a request from the electronic pen client 22 to the name server 26 containing identification of the detected position. The name server 26 responds by sending a reply to the electronic pen client 22 containing a URL where an application description can be found or, if the detected position is not registered in the name server 26, containing an indication that no associated application is known to exist.

Once the electronic pen client 22 knows the URL where an application description can be found, the electronic pen client 22 can initiate a get application description procedure, which allows the electronic pen client 22 to

retrieve the application description from the application server 30. In particular, the electronic pen client 22 sends an application description request containing a unique ID for the requesting electronic pen 10 and/or electronic pen client 22 to the application server 30 located at the URL address provided by the name server 26. In response, the application server 30 provides an application description object to the electronic pen client 22, which loads the application onto the electronic pen client 22. The application description object is similar to an HTML form with some additions and modifications.

Furthermore, the application description object can be sent from the application server 30 to the electronic pen client 22 in response to a submitted form (i.e., a submission of one completed form might automatically result in a new form being loaded onto the electronic pen client 22). A related procedure is the application submit procedure, which is used by the electronic pen client 22 when the user of the electronic pen 10 selects a "submit" field in a form. In response to the selection of the "submit" field, the electronic pen client 22 will submit

the form content in accordance with instructions received in the application description. Typically, the electronic pen client 22 will submit the form content, in the same way as a regular web browser, to a URL specified in a form tag of the application description.

When an action that can be handled by the electronic pen 10 itself is generated, an action procedure is initiated by the electronic pen 10 to send an action request object to the electronic pen client 22. If the electronic pen client 22 cannot translate the action into a field value itself, the electronic pen client 22 further forwards the request to a base translator 28 for translating the action into a field value. In response to the action request object, an action reply object is sent from the electronic pen client 22 to the electronic pen 10. The action reply object contains output information that indicates to the electronic pen 10 which outputs signals to use. The output information, however, cannot be of type that the electronic pen 10 has previously indicated that it does not support. In some instances, the action reply object might contain a new grid description. In such a case the electronic pen 10 will unload its

current grid description and load the new grid description. Similarly, if the action reply object contains an empty grid description, the electronic pen 10 will simply unload its current grid description.

The action request object is also sometimes used to specify actions that should be processed by the control node 24. In this instance, the electronic pen client 22 initiates a control procedure by forwarding the received action to the appropriate control node 24. As a result, the control node 24 sends an action reply object to the electronic pen client 22.

The operation of the electronic pen 10 will now be discussed in greater detail. Each electronic pen 10 has a unique pen ID, which is sent to the application server 30 when an application description is requested. The electronic pen ID allows the application to identify the particular user that is using the application and to distinguish between multiple concurrent users of the same application, such as when different electronic pens 10 are being used in connection with separate sheets of paper that each contain the same portion of the address pattern.

Referring now to FIGURE 7, there is illustrated a block diagram of the electronic pen logic that handles positions, strokes, actions, and grid descriptions for the electronic pen 10. The electronic pen 10 includes a control block 32 for controlling the operation of the electronic pen 10. A grid description block 34 represents a memory location that stores a current grid description. At any given time, the electronic pen 10 can be in either of two modes. In a first mode, a grid description is loaded, while in a second mode, the grid description block 34 is not loaded with a current grid description.

As the electronic pen 10 moves across an address pattern, the electronic pen 10 periodically (e.g., every 1/100 of a second) detects a position by detecting all of the dots within, for example, a 3mm by 3mm area. Each detected position is forwarded (as indicated at 36) to a position first in first out (FIFO) block 38, which acts as a buffer for temporarily storing the detected positions. The clocking of the position FIFO block 38 is controlled by the control block 32 (as indicated at 40).

The detected position is fed from the position FIFO block 38 (as indicated at 42) to an in grid detector 44.

The in grid detector 44 retrieves data from the grid description block 34 (as indicated at 46) and determines whether the received position is within the loaded grid description. If not, the in grid detector 44 notifies the control block 32, which in turn initiates a request for a new grid. When the detected position is within the current grid, the position is then sent (as indicated at 50) from the in grid detector 44 to a stroke engine 52. The stroke engine 52 converts the received positions into strokes, which are then sent (as indicated at 54) to an action engine 56. A complete stroke is created when the electronic pen 10 is lifted from the paper or when it moves outside of the grid field where the stroke began. Finally, the action engine 56 converts the received stroke into an action that can be sent to the electronic pen client 22. By using grid action-field-types, the action engine knows which type of action to produce for a specific grid field.

Referring now to FIGURE 8, there is illustrated a block diagram of a state machine for the control block 32 shown in FIGURE 7. In this figure, events are indicated in capital letters, while tasks associated with the event

are depicted in brackets. The process starts at step 60 with a start up event 62, which causes the position FIFO block 38 to begin receiving detected positions. Initially, the electronic pen 10 is in a no grid loaded state 64, which means that the electronic pen 10 does not have a grid loaded in the grid description block 34. As a result, the control block 32 generates an outside grid indication 66, thereby causing the electronic pen 10 to send the request for a new grid description to the electronic pen client 22 (i.e., in accordance with the new grid procedure) and to stop the FIFO buffer 38. At this point, the electronic pen 10 enters a waiting for grid state 68.

Once the new grid has been received (as indicated at 70), the control block 32 moves to a grid loaded state 72, at which time the new grid is loaded into the grid description block 34 and the position FIFO block 38 resumes operation. On the other hand, if no grid is received (as indicated at 74), at least a portion of the positions stored in the FIFO buffer 38 are erased. Which part of the FIFO buffer to erase is determined by the grid exception area, if any, in the received empty grid

description. Accordingly, all positions stored in the FIFO buffer 38 that are within the grid exception area should be erased. If no grid exception is received, the stroke associated with the position is erased. In addition, the FIFO block 38 resumes operation and the control block 32 moves into the no grid loaded state 64.

When the control block 32 is in the grid loaded state 72, a current grid is loaded in the grid description block 34. While the control block 32 remains in this state 72, the position FIFO block 38 continues to receive detected positions and passes them on to the stroke engine 52 and action engine 56. Actions produced by the action engine 56 are sent (as indicated at 58) to the electronic pen client 22 (i.e., in accordance with the action procedure described above).

At some point, an outside grid indication 74 may be received by the control block 32 from the in grid detector 44. The outside grid event 74 causes the FIFO block 38 to stop generating new positions. In addition, the electronic pen 10 enters a flushing stroke and action state 76 wherein the strokes that are currently in the stroke engine 52 and the actions that are currently in the

action engine 56 are flushed to the electronic pen client 22. Once the stroke engine 52 and action engine 56 have been fully flushed (as indicated at 78), the electronic pen 10 sends a request for a new grid to the electronic pen client 22 and unloads the current grid. The control block 32 then moves back into the waiting for grid state 68.

As a general matter, the electronic pen 10 may be capable of supporting various different types of output, including audio, such as warning tones; visual, such as a flashing light; tactile, such as vibration; and/or ink. In some cases, it might be desirable to allow the user of the electronic pen 10 to turn off1 the ink of the pen 10, such as when the electronic pen is being used on a portion of the address pattern that is public or shared or when the user wants to be able to reuse the current sheet of paper.

The electronic pen client 22 will now be described in greater detail. Generally, the electronic pen client 22 is analogous to a regular web browser. It is responsible for loading applications from application servers 30 and for handling input form the electronic pen 10. Preferably, the electronic pen client 22 is located in a

separate device from the electronic pen 10 itself. This is because it is desirable to minimize the size and power supply requirements of the electronic pen 10, which will likely be adversely affected by the processing resources and memory necessary to support the functions of the electronic pen client 22.

Referring now to FIGURE 9, there is illustrated a block diagram of a state machine for the electronic pen client 22. Initially, the electronic pen client 22 is in a no application loaded state 80. The electronic pen client 22 recognizes only one signal when in this state 80, namely a new grid request from the electronic pen 10. Such a request causes a load grid indication event 82. The electronic pen client 22 responds by sending a request to the name server 26 to translate a position contained within the new grid request into a URL where the application description can be found (i.e., in accordance with the find application location procedure). Next, the electronic pen client 22 enters a waiting for application description URL state 84. If no URL for the application description can be found (as indicated at 86), the electronic pen client 22 sends a new grid reply to the

electronic pen 10, wherein the reply contains an empty grid description with a grid exception. As a result, the electronic pen client 22 returns to the no application loaded state 80.

If a URL for the application description is received from the name server 26 (as indicated at 88), the electronic pen client 22 sends a request to the application server 30 to retrieve the application description (i.e., in accordance with the get application description procedure). Accordingly, the electronic pen client 22 enters a waiting for application description state 90.

If the electronic pen client 22 does not receive an application description from the application server 30 (as indicated at 92), a new grid reply is sent by the electronic pen client 22 to the electronic pen 10 wherein the reply contains an empty grid. Thus, the electronic pen client 22 returns to the no application loaded state 80. If, however, the electronic pen client 22 does receive an application description from the application server 30 (as indicated at 94), the electronic pen client 22 sends a new grid reply to the electronic pen 10

containing a new grid description, and the electronic pen client 22 loads the application in its memory. In addition, the electronic pen client 22 moves into an application loaded state 96.

In the application loaded state 96, five types of actions can be received by the electronic pen client 22 from the electronic pen 10. First, a received action can include a request that the electronic pen client 22 cannot handle itself, in which case the electronic pen client 22 will send the action to the base translator 28 (as indicated at 98). The electronic pen client 22 then moves into a waiting for response from the base translator state 100. Once a base translator response 102 is received by the electronic pen client 22, the electronic pen client 22 updates a current form or other data associated with the currently loaded application and sends an action reply to the electronic pen 10 with appropriate output information.

Another type of action that the electronic pen client 22 can receive from the electronic pen 10 is a request that should be forwarded to a control node 24. In such a case, the action is sent to a control URL specified in the application description (as indicated at 104), and the

electronic pen client 22 enters a waiting for response from the control state 106. Once a response is received from the control (as indicated at 108), the electronic pen client 22 sends an action reply to the electronic pen 10 with appropriate output information.

A third type of action is a submit form request, in response to which the electronic pen client 22 will submit the current form to the application server 30 that is identified by the URL in the application description (as indicated at 110). The electronic pen client 22 then enters a waiting for response from the application server state 112. If the application server 30 responds by sending an empty application description to the electronic pen client 22 (as indicated at 114), the current application is unloaded from the electronic pen client 22 and an action reply is sent to the electronic pen 10 with an empty grid. As a result, the electronic pen client 22 returns to the no application loaded state 80. On the other hand, if the application server 30 responds with a non-empty application description, the old application is unloaded from the electronic pen client 22, the new application description is parsed and loaded in the

electronic pen client 22, an action reply is sent to the electronic pen 10 with a new grid description and with appropriate output information, and finally the electronic pen client 22 returns to the application loaded state 96.

A fourth type of action that can be received by the electronic pen client 22 from the electronic pen 10 is a request to load a new grid. This action occurs, for example, when a position outside of the current grid is detected by the electronic pen 10. When a new grid request is received, the electronic pen client 22 sends a request to the name server 26 (as indicated at 116) and the electronic pen client 22 returns to the waiting for application description URL state 84.

Finally, a fifth type of action that can be received by the electronic pen client 22 is an action that the electronic pen client 22 can handle itself, in which case the electronic pen client 22 updates the current form and sends an action reply to the electronic pen 10 with appropriate output information (as indicated at 118). The electronic pen client 22 then remains in the application loaded state 96. One type of action that the electronic pen client 22 might be able to handle itself is a local

application. For example, the electronic pen client 22 might be capable of performing certain basic functions that are defined by a local application. Thus, when the electronic pen client 22 receives a new grid request, the position associated with the new grid request can be analyzed to determine if it corresponds to a local application. If so, the electronic pen client 22 can load the application description from its local memory, send a new grid description to the electronic pen 10 without having to communicate with the name server 26 or the application server 30.

Another action that might be handled locally by the electronic pen client 22 relates to the selection of fields within a form. When the electronic pen client 22 receives an action, the field that corresponds to that action receives focus. When this occurs, the electronic pen client 22 might display the field's value on its display or output the value by audio. In addition, the electronic pen client 22 might allow the user to edit the value of the field by means other than the electronic pen 10. Yet another type of action that might be handled by the electronic pen client 22 itself are actions that

relate to a clipboard function. When a "copy" field is selected, the value of the field that had focus at the time the copy field was selected is transferred to the clipboard. Similarly, when a "paste" field is selected, the value stored in the clipboard is transferred to the field that had focus at the time the paste field was selected.

Referring now to FIGURES 10A through 10C, there is shown, by way of example, a message flow and signaling diagram illustrating the operation of the electronic pen system 2 depicted in and discussed in connection with FIGURE 2. Initially, the electronic pen 10 detects a first position on the address pattern at step 120 (e.g., at a location on a sheet of paper designated for composing and sending emails). At this stage, it is assumed that the electronic pen 10 is in a no grid loaded state. Thus, in response to the detection of the first position, the electronic pen 10 sends a new grid request 122, which contains the detected position information, to the electronic pen client 22. As a result, the electronic pen client 22 sends an application location request 124 containing the detected position information to the name

server 26, at step 126. The name server 26 translates the detected position into a URL where an application description that corresponds to the detected position can be found (e.g., a URL address for a server containing an email application), and returns an application location reply 128 containing the retrieved URL to the electronic pen client 22.

The electronic pen client 22 then sends an application description request 130, which contains the unique pen ID for the electronic pen 10, to the application server 30. The application server 30 retrieves the application description at step 132 and sends an application description reply 134 containing the retrieved application description to the electronic pen client 22. The electronic pen client 22 then parses and stores the application description at step 136. This step further involves generating a current grid description from the application description and sending the grid description to the electronic pen 10 in a new grid reply 138. The electronic pen 10 stores the received grid description at step 140 and resumes processing of the detected positions. Using the detected positions and the

information in the grid description (e.g., so that the electronic pen 10 knows which fields of the email form are being filled in), the electronic pen 10 generates strokes at step 142 and generates actions at step 144 using the stroke engine 52 and action engine 56 shown in FIGURE 7.

Each time an action is generated that cannot be handled by the electronic pen 10 itself, an action request 146 containing a description of the action is sent from the electronic pen 10 to the electronic pen client 22. At this point, the electronic pen client 22 should determine what type of action has been received so that it can respond to the action in an appropriate manner. First, it is determined whether the action requires the attention of, or otherwise should be processed in accordance with, a local application at step 148. Very basic applications or frequently used applications (e.g., delete entered text), for example, might be stored locally to avoid having to contact another entity. In such a case, the electronic pen client 22 retrieves the local application at step 150 and sends an action reply 152, which can contain a new grid description or other appropriate information.

However, if it is determined at step 148 that the received action does not relate to a local application, the process continues at step 154 where it is determined whether the received action requires processing by an external translator (e.g., handwriting recognition). If so, an action request 156 containing a description of the action is sent by the electronic pen client 22 to the base translator 28. The base translator 28 processes the action at step 158 and sends an action reply 160 containing output information responsive to the received action (e.g., text corresponding to written characters) to the electronic pen client 22, which can forward the output information to the electronic pen 10 in an action reply 162, if necessary.

If it is determined at step 154 that the received action does not require processing by an external translator, it is next determined whether the action relates to a control application at step 164. If so, an action request 166 containing a description of the action is sent by the electronic pen client 22 to the control server 24. The control server 24 processes the received action at step 168 and, if a response is necessary,

returns output information responsive to the received action in an action reply 170, which is forwarded from the electronic pen client 22 to the electronic pen 10 in an action reply 172.

Assuming that it is determined at step 164 that the received action does not relate to a control function, it is next determined whether the action comprises a request to submit a form at step 174 (e.g., a selection of a "send" area on the email form). If so, an action request 176 containing the data entered onto the form is sent by the electronic pen client 22 to the application server 30. The application server 30 processes the form at step 178 and sends an action reply 180 containing a new application description (or an empty application description) to the electronic pen client 22. The electronic pen client 22 parses and stores the new application description at step 182 and generates a new grid description from the newly received application description. The electronic pen client 22 then sends an action reply 184 containing the new grid description. Although not illustrated in the figure, the electronic pen 10 will typically respond to the receipt of a new grid description by unloading its

current grid description and loading the new grid description into its memory.

At some point, it is assumed that the electronic pen 10 detects a position that is outside of the currently loaded grid at step 186. In response to such an event, the electronic pen 10 sends a new grid request 188 containing the newly detected position data to the electronic pen client 22. In response, the electronic pen client 22 again generates an application location request 190 containing the detected position data and sends the request to the name server 26. The name server 26 determines whether a URL for an application description that corresponds to the newly detected position is available at step 192.

If so, the name server 26 sends an application location reply 194 containing a retrieved URL to the electronic pen client 22, which in turn sends an application description request 196 containing the unique pen ID for the electronic pen 10 to the application server 30 at the identified URL address, just as previously discussed in connection with messages 128 and 130. In this case, however, it is assumed that the application

server 30 determines that the requested application description is unavailable at step 198. As a result, the application server 30 sends an application description reply to the electronic pen client 22 containing an empty application description. In response to the receipt of an empty application description, the electronic pen client 22 unloads the current application at step 202 and sends a new grid reply 204 containing an empty grid description to the electronic pen 10. The electronic pen 10 responds to the receipt of the empty grid description by unloading the current grid description at step 206.

Another possibility is that the name server 26 determines at step 192 that a URL corresponding to the detected position is not available. In this situation, the name server 26 sends an application location reply 208 to the electronic pen client 22. The reply 208 may simply be empty to indicate that a URL is not available. Preferably, however, the reply 208 contains a grid exception defining the largest area possible around the detected position for which there is no corresponding URL. In response to the reply 208, the electronic pen client 22 sends a new grid reply 210 containing an empty grid

description with a grid exception. Upon receiving the reply 210, the electronic pen 10 unloads the current grid description at step 212. Furthermore, assuming that the electronic pen 10 receives and recognizes the grid exception information, the electronic pen 10 may subsequently be able to determine that certain detected positions on the address pattern are not associated with any application without having to send a request to the name server 26 or the application server 30.

In accordance with the present invention, an electronic pen 10 can be used to control a separate utility device using a wireless application protocol (WAP) server associated with the separate utility device. Such a system operates in much the same way as described in Swedish Application No. 9904373-9, entitled "A Device and a Method for Operating an Electronic Utility Device from a Portable Telecommunication Apparatus," filed December 1, 1999, and U.K. Application No. 0018027.3, entitled "Communications Systems," filed July 21, 2000, both of which are incorporated herein by reference. In the present invention, however, a user of the electronic pen 10 can access, control, and operate each of a plurality of

electronic accessories, home appliances, or other external electronic utility devices using a WAP browser contained either in the electronic pen 10 or in an electronic pen client 22. By using the electronic pen 10 on an addressed surface 12, a user can input commands or other data that can be communicated by the WAP browser to a WAP server module associated with the electronic accessory, home appliance, or other external electronic utility device to be accessed, controlled, or operated.

Referring now to FIGURE 11, there is illustrated a schematic diagram of a control system 220 in accordance with the present invention. By writing with the electronic pen 10 on, or touching the electronic pen 10 to, an appropriate area on an addressed surface 12 (e.g., a sheet of paper that contains a form for controlling a particular electronic utility device), a WAP browser 222 or electronic pen client 22 can be used to communicate with a WAP server module 224, 226, or 228 by sending a command or other data corresponding to the information entered or written with the electronic pen 10. The WAP server module 224, 226, or 228 then uses the command or other data to operate the associated electronic utility

device 230, 232, or 234 and/or to control the functionality thereof.

In one embodiment of the invention, the WAP browser 222 or electronic pen client 22 is included in the electronic pen 10 itself. The electronic pen 10, using the WAP browser 222 or client processor, detects positions of the electronic pen 10 relative to the addressed surface 12 and translates the detected positions into uniform resource locators (URLs) with common gateway interface (CGI) calls. The CGI calls are then transmitted by a Bluetooth™ transceiver 236 in the electronic pen 10, via a Bluetooth™ radio interface 238 to the WAP server module 224, 226, or 228 associated with the identified URL. In this case, the portion of the address pattern associated with the WAP server module 224, 226, or 228 must first be loaded into the electronic pen 10 to enable the electronic pen 10 to translate detected positions into appropriate commands or other data. This information can be downloaded into electronic pen 10 by a personal computer (PC) 240 or mobile station 14 using a Bluetooth™ radio interface 238. Alternatively, instead of using a Bluetooth™ radio interface 238, other types of wireless

technology, such as infrared signalling or inductive coupling, or wired technology, such as a cable connection, can be used.

As an example, the electronic pen 10 can be used in connection with a sheet of paper containing a predefined portion of the address pattern to control a CD player 230. For instance, by drawing a play symbol, writing the word "play," or touching the electronic pen 10 within a "play" field on the sheet of paper, the WAP server module 224 associated with the CD player 230 can execute the play command and cause the CD player 230 to begin playing a CD. Furthermore, the electronic pen 10 can be used to perform more advanced functions, such as programming a VCR. In particular, the electronic pen 10 can be used to fill in a "program VCR" form. The electronic pen 10 then transmits the VCR timer settings via a Bluetooth™ interface 238 to the WAP server module 226 associated with the VCR 232. As a result, the WAP server module 226 automatically programs the VCR 232 to record in accordance with the designated timer settings.

In another embodiment of the invention, the WAP browser 222 or electronic pen client 22 is implemented

within a mobile phone 14 or other electronic device, such as a PC 240. In this case, grid information relating to the portion of the address pattern used to control a particular electronic utility device 230, 232, or 234 can be downloaded via an air interface or other Internet connection using WAP. In this case, a user of the electronic pen 10 can obtain feedback relating to the commands or entered data using a display screen 242 on the mobile station 14 or other electronic device.

As an example of this embodiment, a portion of a newspaper that lists television program schedules can be formatted with a selected portion of the address pattern. By using the electronic pen 10 to draw a circle around a particular television program, a user indicates that the selected program should be recorded by the VCR 232 or that a television 234 should be tuned to the identified television program. The positions on the newspaper address pattern detected by the electronic pen 10 are transmitted by a Bluetooth™ transceiver 236 via a Bluetooth™ radio interface 238 to the mobile station 14. The mobile station 14 downloads information about the area of the address pattern on which the positions are

detected. Using this information, the WAP browser 222 or electronic pen client 22 in the mobile station 14 translates the detected positions into appropriate commands for controlling the VCR 232 or television set 234. The identified commands are transmitted by the WAP browser 222 to the appropriate WAP server module 226 or 228, directly or via the Bluetooth™ transceiver 236 of the electronic pen 10, over a Bluetooth™ radio interface 238. The receiving WAP server module 226 or 228 then performs the requested operation.

Although various preferred embodiments of the method and apparatus of the present invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it is understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions without departing from the spirit of the invention as set forth and defined by the following claims. Furthermore, it shall be understood that the terms "comprises" and "comprising," when used in the foregoing Detailed Description and the following claims, specifies the presence of stated features, elements,

steps, or components but does not preclude the presence or addition of one or more other features, elements, steps, components, or groups thereof.

WHAT IS CLAIMED IS:

1. An electronic reading device, comprising:

a sensor for detecting a portion of an address pattern on a formatted surface, wherein a position of the electronic reading device relative to the address pattern can be determined from the detected portion;

a processor for translating the detected portion of the address pattern into an identified position and for generating a wireless application protocol (WAP) message based, at least in part, on the identified position; and

a transmitter for transmitting the WAP message to a WAP server.

2. The electronic reading device of claim 1, wherein the sensor detects a plurality of successive portions of the address pattern and the processor translates the plurality of successive portions into a plurality of successive identified positions, the WAP message based on the plurality of successive identified positions.

3. The electronic reading device of claim 1, wherein the processor comprises a WAP browser.

4. The electronic reading device of claim 1, wherein the WAP message comprises a command for controlling an electronic utility device.

5. The electronic reading device of claim 4, wherein the WAP server is associated with the electronic utility device.

6. The electronic reading device of claim 1, wherein the transmitter transmits the WAP message via a local wireless link.

7. The electronic reading device of claim 1, wherein the transmitter sends the WAP message using one of an infrared signal, inductive coupling, and a Bluetooth radio interface.

8. The electronic reading device of claim 1, wherein the transmitter sends the WAP message using a cable.

9. The electronic reading device of claim 1, wherein the WAP message comprises a uniform resource locator (URL) and at least one common gateway interface (CGI) call.

10. A system for controlling electronic utility devices, comprising:

a formatted surface having an address pattern such that a position relative to the address pattern can be determined from a portion of the address pattern;

an electronic reading device having a sensor for detecting positions of the electronic reading device relative to the address pattern;

a client processor for generating a wireless application protocol (WAP) message based on at least one detected position;

an electronic utility device; and

a WAP server associated with the electronic utility device for receiving the WAP message and for controlling the electronic utility device in accordance with the received WAP message.

11. The system of claim 10, wherein the electronic reading device includes the client processor.

12. The system of claim 11, wherein the electronic reading device further includes a radio transceiver for transmitting the WAP message to the WAP server and for receiving data relating to the address pattern from a separate electronic device.

13. The system of claim 11, wherein the electronic reading device transmits the WAP message to the WAP server using one of an infrared signal, inductive coupling, and a cable connection.

14. The system of claim 10, wherein the client processor is located in a separate electronic device.

15. The system of claim 14, wherein the separate electronic device comprises a mobile station.

16. The system of claim 14, wherein the separate electronic device includes a display for displaying information relating to the WAP message.

17. The system of claim 10, wherein the WAP message comprises a common gateway interface (CGI) call.

18. The system of claim 17, wherein the client processor further identifies a uniform resource locator (URL) associated with the at least one detected position.

19. The system of claim 10, wherein the electronic utility device is selected from the group consisting of an appliance, an electronic audio device, and an electronic video device.

20. A method for controlling an electronic utility device, comprising the steps of:

detecting a portion of an address pattern with an electronic reading device;

identifying at least one position of the electronic reading device relative to the address pattern using the detected portion of the address pattern;

translating the at least one position into a control message for a particular electronic utility device; and

controlling the particular electronic utility device in accordance with the control message.

21. The method of claim 20, wherein the step of identifying at least one position comprises identifying handwritten information.

22. The method of claim 20, wherein the control message comprises a wireless application protocol (WAP) message.

23. The method of claim 20, further comprising the steps of:

identifying a uniform resource locator (URL) associated with the detected portion of the address pattern; and

sending the control message to the identified URL.

24. The method of claim 23, wherein the identified URL is associated with the electronic utility device.

25. The method of claim 23, wherein the control message is sent via a cable connection.

26. The method of claim 23, wherein the control message is sent via one of an infrared interface, an inductive coupling, and a Bluetooth radio interface.

27. The method of claim 20, further comprising the step of sending the control message to a server associated with the particular electronic utility device, wherein the server performs the step of controlling.

28. The method of claim 20, wherein the control message includes a common gateway interface (CGI) call.

29. The method of claim 20, further comprising the step of retrieving data relating to the detected portion of the address pattern, said data for use in the step of translating.

ABSTRACT OF THE DISCLOSURE

A method and system for controlling an electronic utility device is implemented using an electronic reading device. A sensor in the electronic reading device detects portions of an address pattern on a surface that is formatted for use in controlling the electronic utility device. Based on the detected portions, a processor and/or wireless application protocol (WAP) browser, located in the electronic reading device or in a separate electronic device, can identify a position or positions of the electronic reading device relative to the address pattern and translate the identified position(s) into a control message. The control message is transmitted to a WAP server module associated with the electronic utility device, and the WAP server module accesses, controls, or operates the electronic utility device in accordance with the control message.

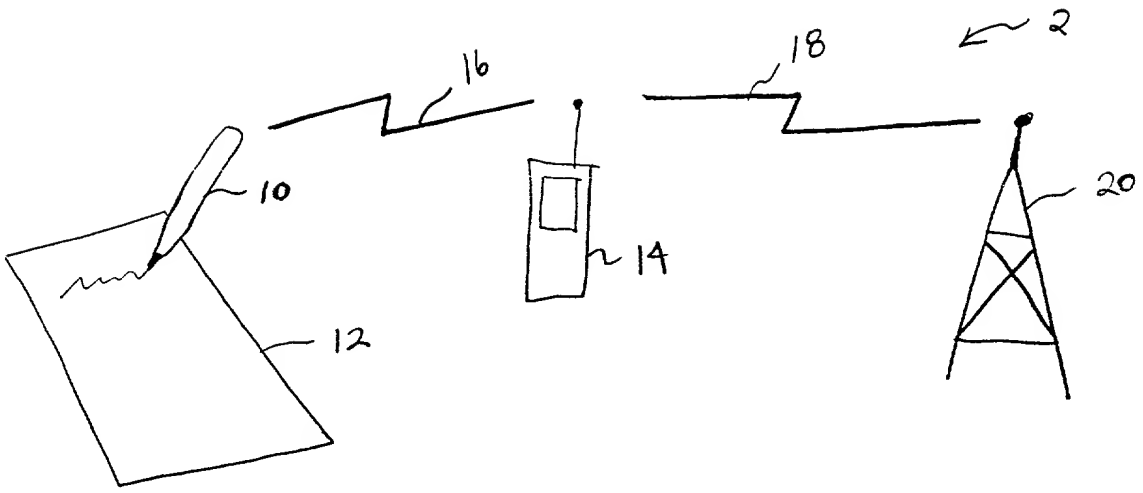
16
18
2
10
20
14
12

FIG. 1

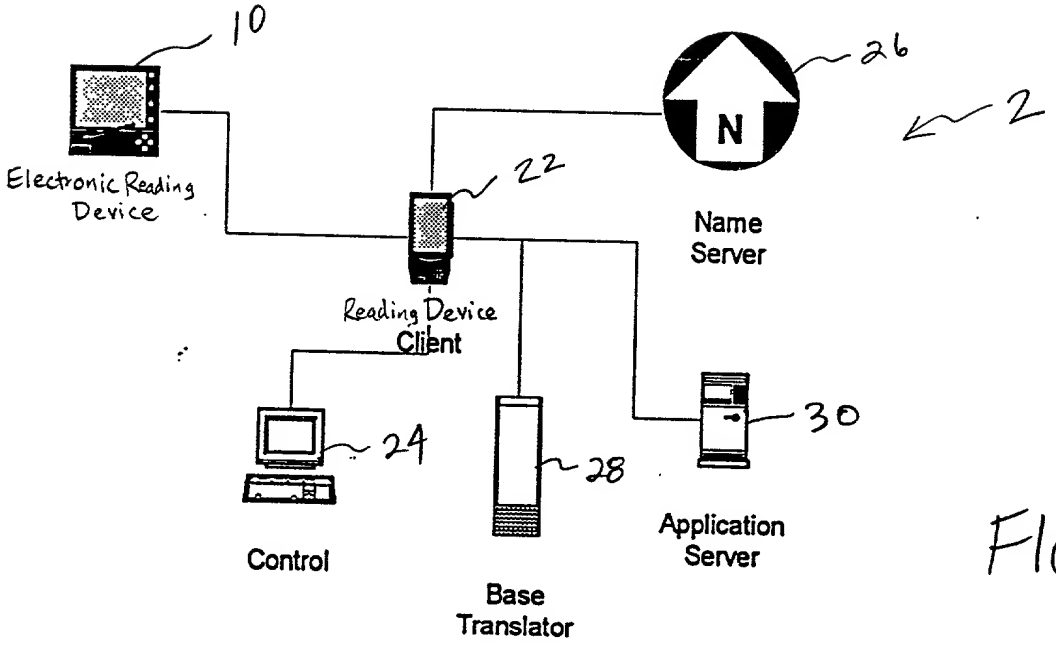
10
26
N
2
Electronic Reading Device
22
Name Server
Reading Device Client
24
30
28
Control
Application Server
Base Translator

FIG. 2

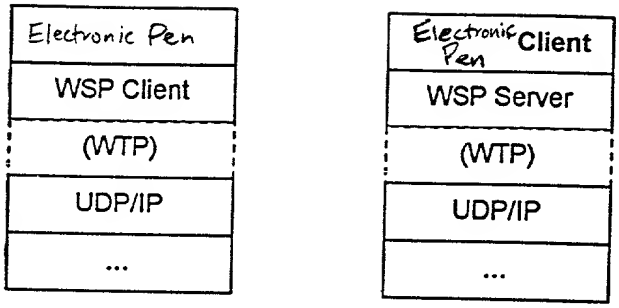

FIG. 3

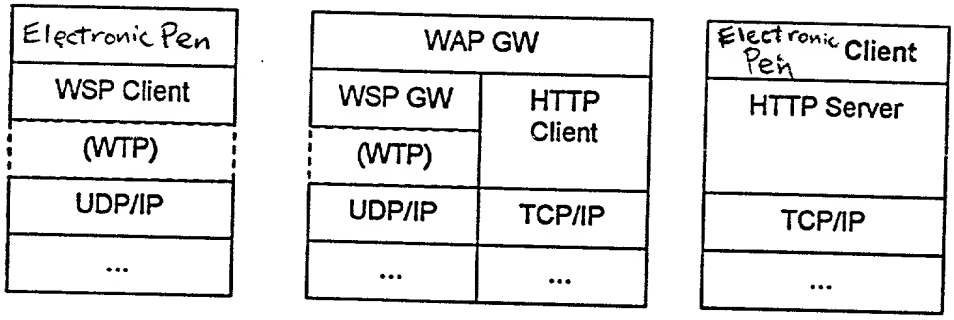

FIG. 4

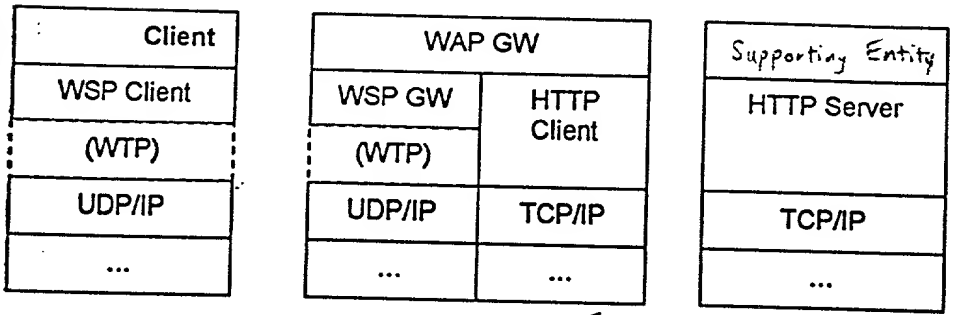

FIG. 5

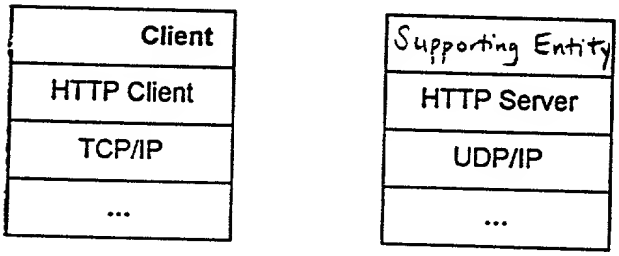

FIG. 6

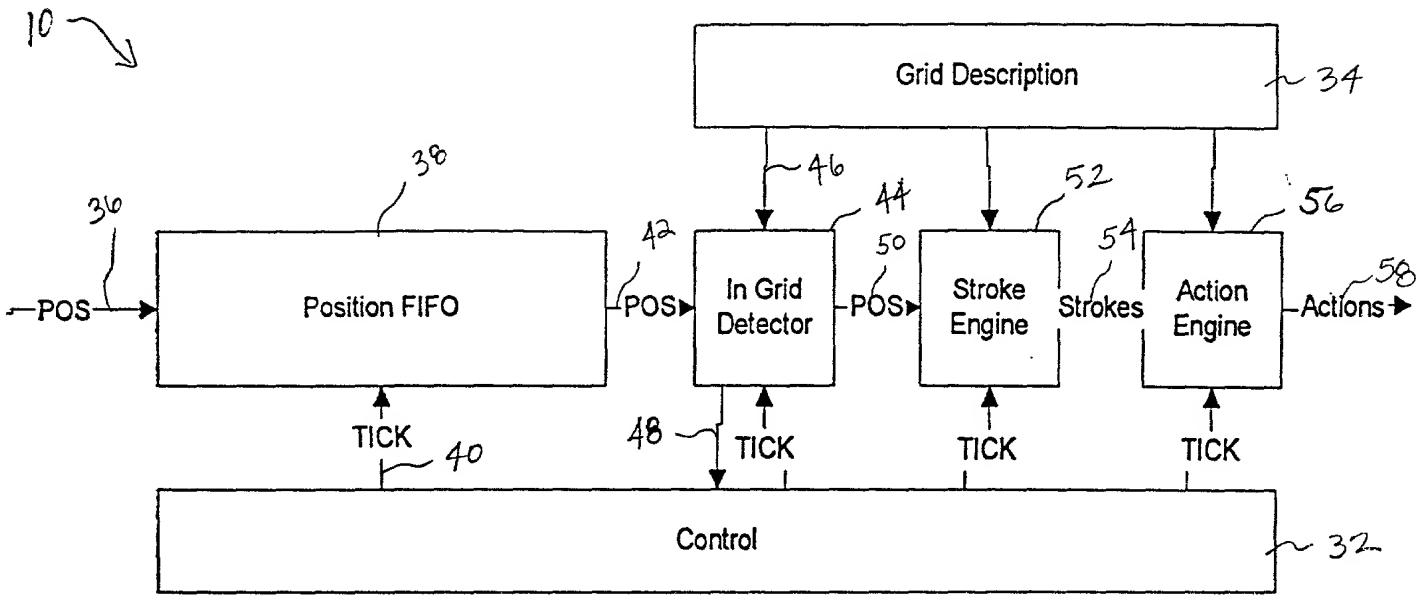
10
Grid Description
34
38
36
46
44
52
56
42
50
54
58
POS
Position FIFO
POS
In Grid Detector
POS
Stroke Engine
Strokes
Action Engine
Actions
TICK
40
48
TICK
TICK
TICK
Control
32

FIG. 7

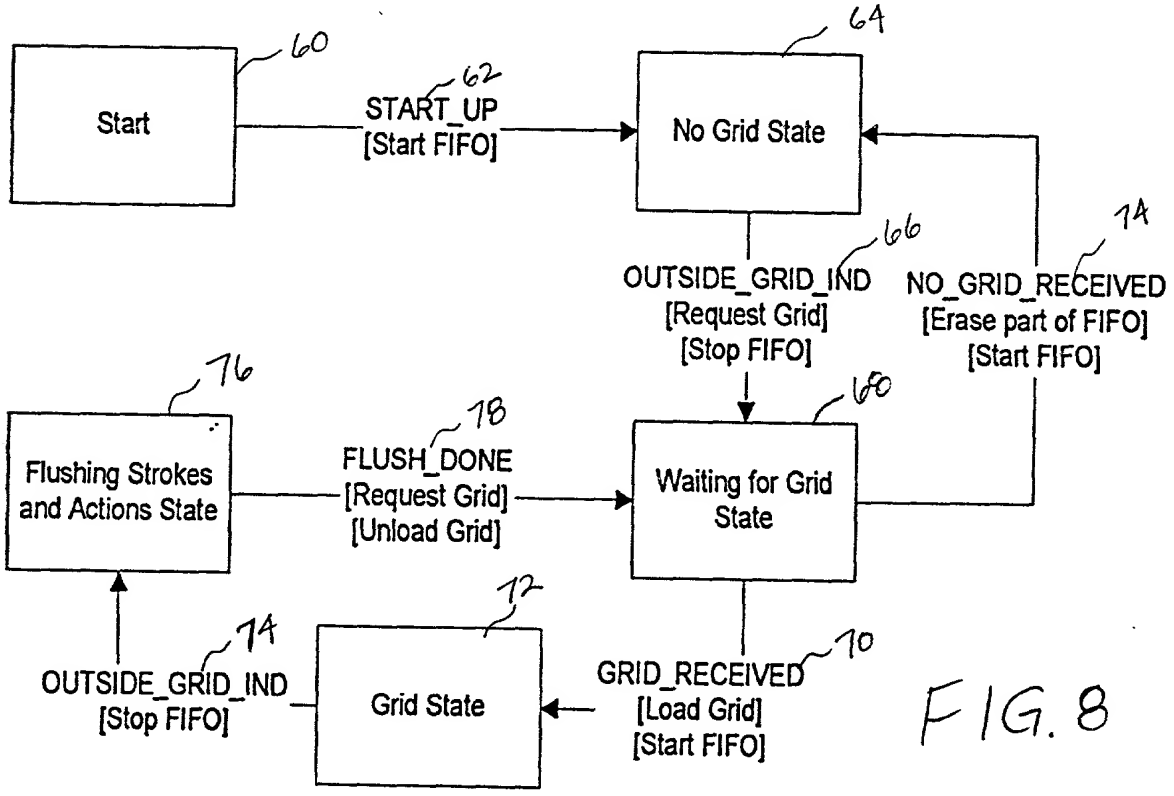
Start
60
START_UP
[Start FIFO]
62
64
No Grid State
OUTSIDE_GRID_IND
[Request Grid]
[Stop FIFO]
66
NO_GRID_RECEIVED
[Erase part of FIFO]
[Start FIFO]
14
76
Flushing Strokes and Actions State
FLUSH_DONE
[Request Grid]
[Unload Grid]
78
Waiting for Grid State
68
OUTSIDE_GRID_IND
[Stop FIFO]
74
72
Grid State
GRID_RECEIVED
[Load Grid]
[Start FIFO]
70

FIG. 8

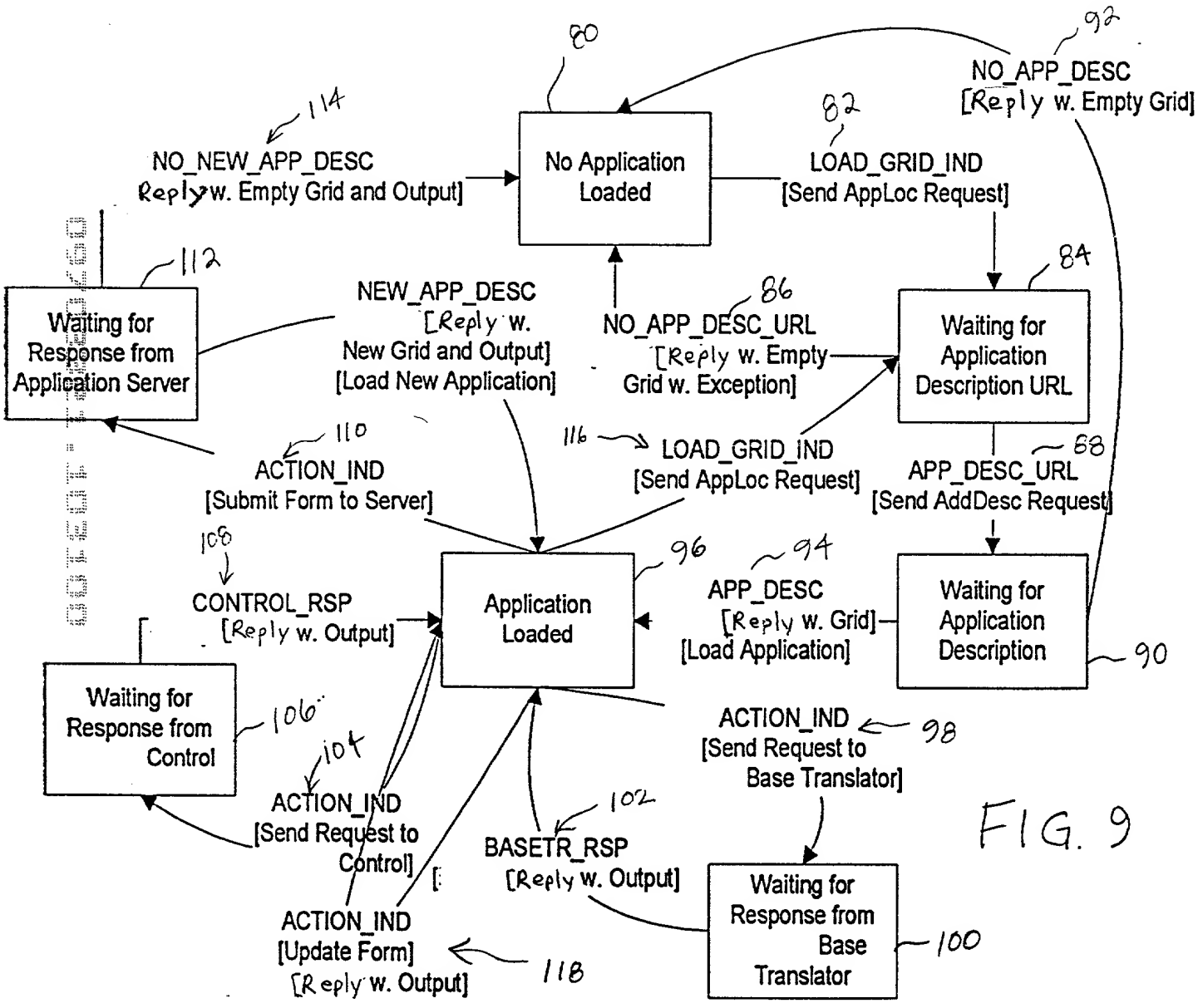
80
92
NO_APP_DESC
[Reply w. Empty Grid]
114
NO_NEW_APP_DESC
Reply w. Empty Grid and Output]
No Application Loaded
82
LOAD_GRID_IND
[Send AppLoc Request]
112
84
Waiting for Response from Application Server
NEW_APP_DESC
[Reply w. New Grid and Output]
[Load New Application]
86
NO_APP_DESC_URL
[Reply w. Empty Grid w. Exception]
Waiting for Application Description URL
110
ACTION_IND
[Submit Form to Server]
116
LOAD_GRID_IND
[Send AppLoc Request]
88
APP_DESC_URL
[Send AddDesc Request]
108
CONTROL_RSP
[Reply w. Output]
96
Application Loaded
94
APP_DESC
[Reply w. Grid]
[Load Application]
Waiting for Application Description
90
Waiting for Response from Control
106
104
ACTION_IND
[Send Request to Control]
ACTION_IND
[Send Request to Base Translator]
98
102
BASETR_RSP
[Reply w. Output]
Waiting for Response from Base Translator
100
ACTION_IND
[Update Form]
[Reply w. Output]
118

FIG. 9

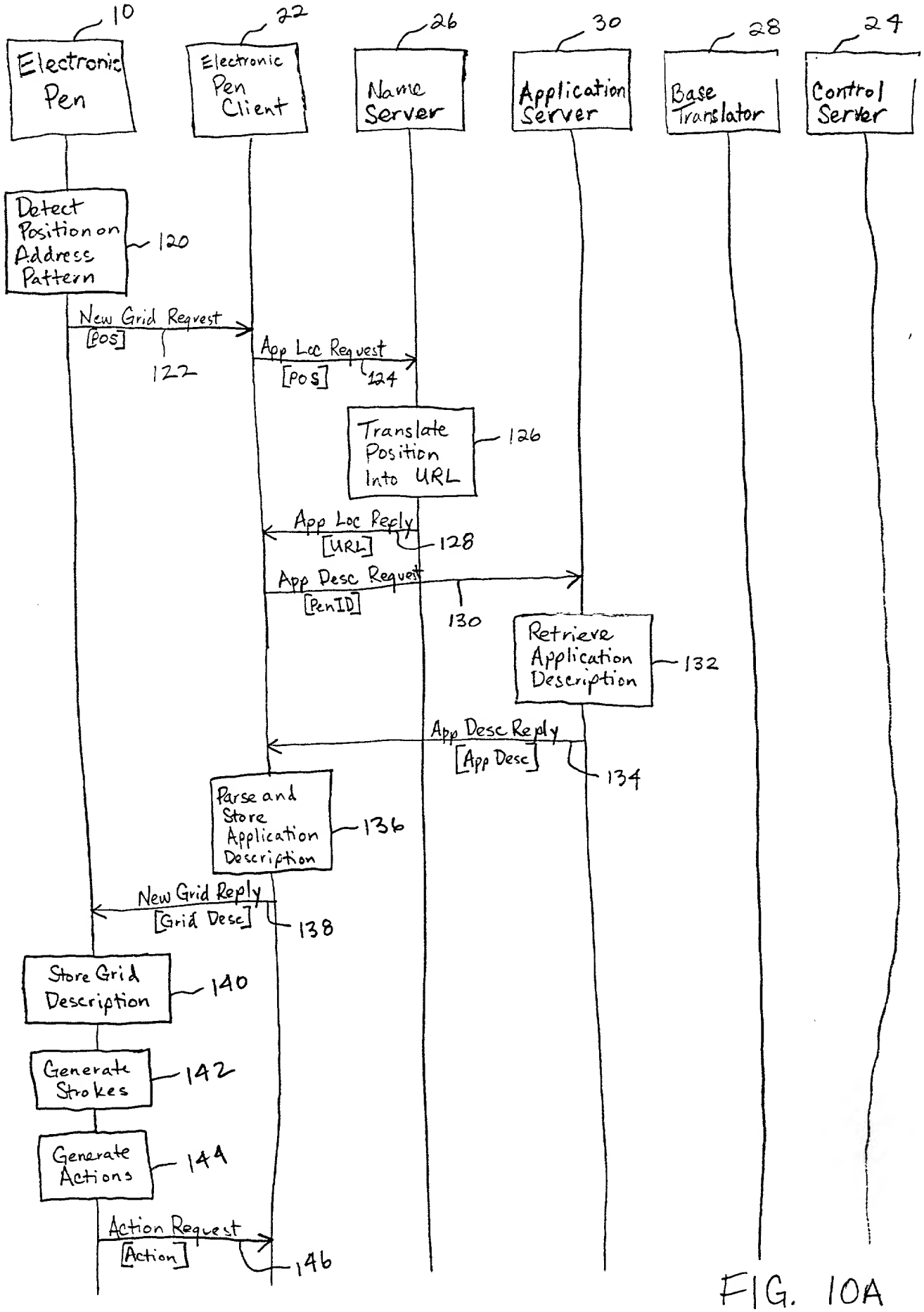
10
Electronic Pen
22
Electronic Pen Client
26
Name Server
30
Application Server
28
Base Translator
24
Control Server
Detect Position on Address Pattern
120
New Grid Request
[POS]
122
App Loc Request
[POS]
124
Translate Position Into URL
126
App Loc Reply
[URL]
128
App Desc Request
[PenID]
130
Retrieve Application Description
132
App Desc Reply
[App Desc]
134
Parse and Store Application Description
136
New Grid Reply
[Grid Desc]
138
Store Grid Description
140
Generate Strokes
142
Generate Actions
144
Action Request
[Action]
146

FIG. 10A

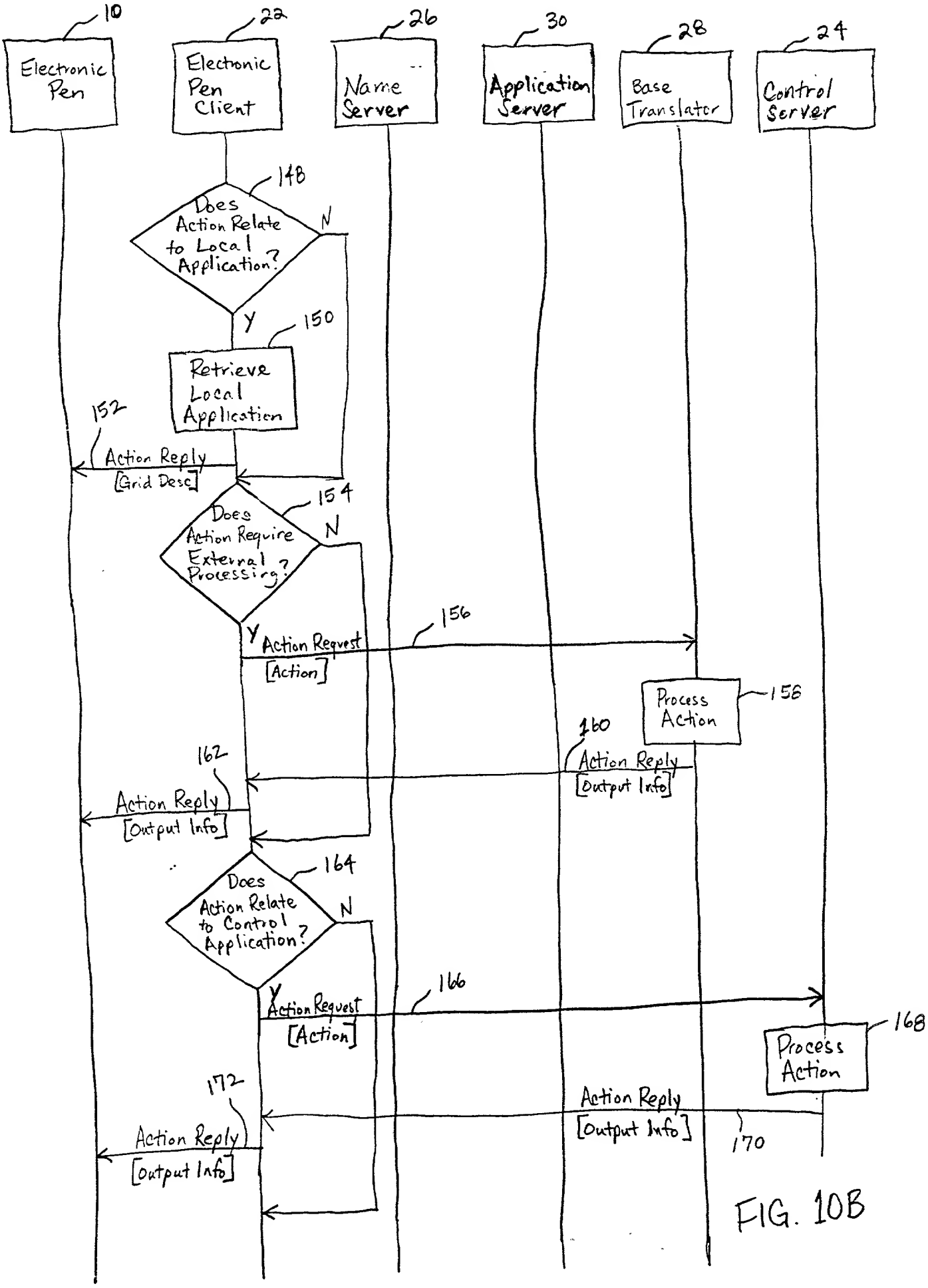
10
Electronic Pen
22
Electronic Pen Client
26
Name Server
30
Application Server
28
Base Translator
24
Control Server
148
Does Action Relate to Local Application?
N
Y
150
Retrieve Local Application
152
Action Reply
[Grid Desc]
154
Does Action Require External Processing?
N
Y
Action Request
[Action]
156
Process Action
156
160
Action Reply
[Output Info]
162
Action Reply
[Output Info]
164
Does Action Relate to Control Application?
N
Y
Action Request
[Action]
166
Process Action
168
Action Reply
[Output Info]
170
172
Action Reply
[Output Info]

FIG. 10B

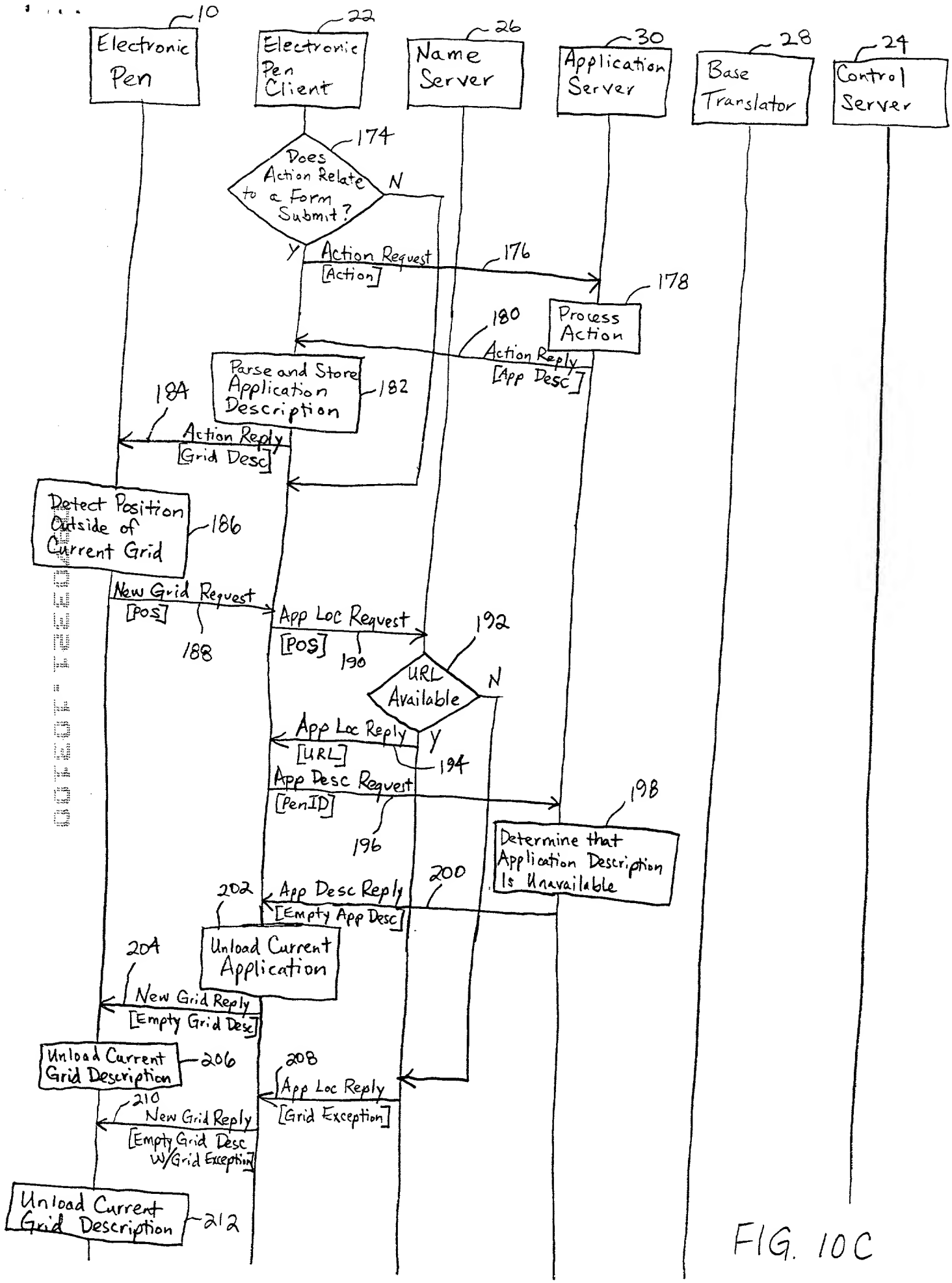
Electronic Pen
10
Electronic Pen Client
22
Name Server
26
Application Server
30
Base Translator
28
Control Server
24
174
Does Action Relate to a Form Submit?
N
Y
Action Request
[Action]
176
178
Process Action
180
Action Reply
[App Desc]
Parse and Store Application Description
182
184
Action Reply
[Grid Desc]
Detect Position Outside of Current Grid
186
New Grid Request
[POS]
188
App Loc Request
[POS]
190
192
URL Available
N
Y
App Loc Reply
[URL]
194
App Desc Request
[PenID]
196
198
Determine that Application Description Is Unavailable
200
202
App Desc Reply
[Empty App Desc]
Unload Current Application
204
New Grid Reply
[Empty Grid Desc]
Unload Current Grid Description
206
208
App Loc Reply
[Grid Exception]
210
New Grid Reply
[Empty Grid Desc W/Grid Exception]
Unload Current Grid Description
212

FIG. 10C

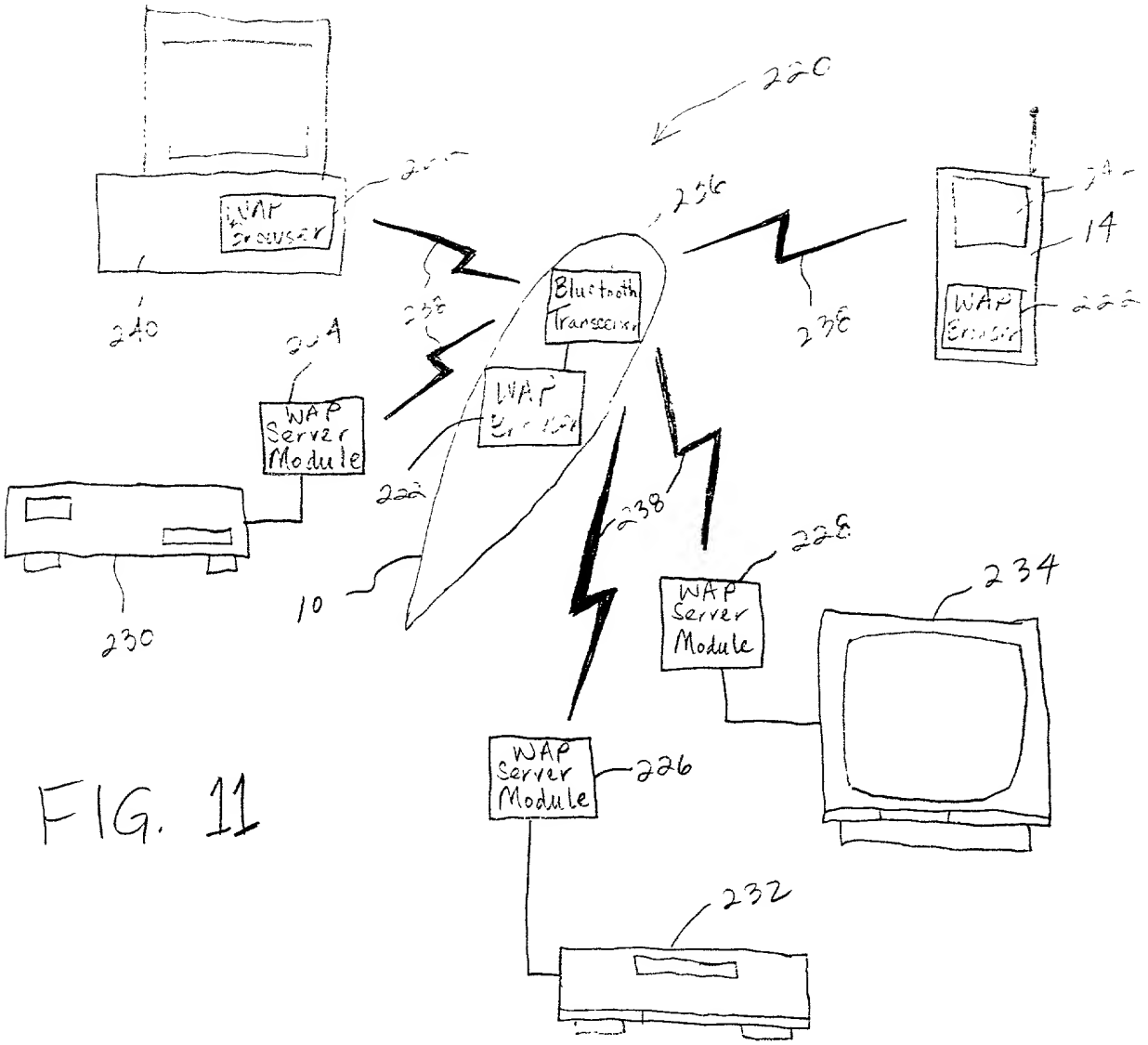
220
WAP Browser
240
WAP Server Module
230
Bluetooth Transceiver
236
14
WAP Server Module
222
WAP Server Module
226
WAP Server Module
228
234
232
10
238

FIG. 11

PATENT APPLICATION
DOCKET NO.: 34650-657PT

RULES 63 AND 67 (37 C.F.R. 1.63 and 1.67)
DECLARATION AND POWER OF ATTORNEY

FOR UTILITY/DESIGN/CIP/PCT NATIONAL APPLICATIONS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **METHOD AND SYSTEM FOR CONTROLLING AN ELECTRONIC UTILITY DEVICE USING AND ELECTRONIC READING DEVICE**, the specification of which: (mark only one)

__	(a)	is attached hereto.
__	(b)	was filed on _ as Application Serial No. _ and was amended on _____ (if applicable)
__	(c)	was filed as PCT International Application No. PCT/_____ on ____ and was amended on _____ (if applicable).
__	(d)	was filed on ___ as Application Serial No. ___ and was issued a Notice of Allowance on ____.
X	(e)	was filed on October 31, 2000 bearing attorney docket number 34650-657PT.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above or as allowed as indicated above.

I acknowledge the duty to disclose all information known to me to be material to the patentability of this application as defined in 37 CFR § 1.56. If this is a continuation-in-part (CIP) application, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability of the application as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application

on which my priority is claimed or, (2) if no priority is claimed, before the filing date of this application:

PRIOR FOREIGN PATENTS

Number	Country	Month/Day/Year Filed	Date first laid-open or Published	Date patented or Granted	Priority Claimed Yes	No
NONE						

I hereby claim the benefit under 35 U.S.C. § 120/365 of any United States application(s) listed below and PCT international applications listed above or below:

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATIONS

Application No. (series code/serial no.)	Month/Day/Year Filed
60/182,742	February 16, 2000
60/190,343	March 16, 2000
60/192,662	March 28, 2000

PRIOR U.S. OR PCT APPLICATIONS

Application No. (series code/serial no.)	Month/Day/Year Filed	Status(pending, abandoned, patented)
NONE		

I hereby appoint:

TIMOTHY G. ACKERMANN, Reg. No. 44,493
BENJAMIN J. BAI, Reg. No. 43,481
MICHAEL J. BLANKSTEIN, Reg. No. 37,097
MARY JO BOLDINGH, Reg. No. 34,713
MARGARET A. BOULWARE, Reg. No. 28,708
ARTHUR J. BRADY, Reg. No. 42,356
MATTHEW O. BRADY, Reg. No. 44,554
DANIEL J. BURNHAM, Reg. No. 39,618
THOMAS L. CANTRELL, Reg. No. 20,849
RONALD B. COOLLEY, Reg. No. 27,187
THOMAS L. CRISMAN, Reg. No. 24,846
STUART D. DWORK, Reg. No. 31,103
WILLIAM F. ESSER, Reg. No. 38,053
ROGER J. FRENCH, Reg. No. 27,786
JANET M. GARETTO, Reg. No. 42,568
JOHN C. GATZ, Reg. No. 41,774
RUSSELL J. GENET, Reg. No. 42,571
GERALD H. GLANZMAN, Reg. No. 25,035
J. KEVIN GRAY, Reg. No. 37,141
STEVEN R. GREENFIELD, Reg. No. 38,166
JOSHUA A. GRISWOLD, Reg. No. 46,310
J. PAT HEPTIG, Reg. No. 40,643
SHARON A. ISRAEL, Reg. No. 41,867
JOHN R. KIRK JR., Reg. No. 24,477
PAUL R. KITCH, Reg. No. 38,206
TIMOTHY M. KOWALSKI, Reg. No. 44,192
JAMES F. LEA III, Reg. No. 41,143
HSIN-WEI LUANG, Reg. No. 44,213
ROBERT W. MASON, Reg. No. 42,848
ROGER L. MAXWELL, Reg. No. 31,855
ROBERT A. McFALL, Reg. No. 28,968
STEVEN T. McDONALD, Reg. No. 45,999
LISA H. MEYERHOFF, Reg. No. 36,869
STANLEY R. MOORE, Reg. No. 26,958
RICHARD J. MOURA, Reg. No. 34,883
MARK V. MULLER, Reg. No. 37,509
P. WESTON MUSSELMAN JR. Reg No. 31,644
DANIEL G. NGUYEN, Reg. No. 42,933
SPENCER C. PATTERSON, Reg. No. 43,849
RUSSELL N. RIPPAMONTI, Reg. No. 39,521
ROSS T. ROBINSON, Reg. No. 47,031
STEPHEN G. RUDISILL,, Reg. No. 20,087
HOLLY L. RUDNICK, Reg. No. 43,065
J.L. JENNIE SALAZAR, Reg. No. 45,065
KEITH W. SAUNDERS, Reg. No. 41,462
JERRY R. SELINGER, Reg. No. 26,582
ZACHARY J. SMOLINSKI, Reg. No. 47,100
GARY B. SOLOMON, Reg. No. 44,347
STEVE Z. SZCZEPANSKI, Reg. No. 27,957
ANDRE M. SZUWALSKI, Reg. No. 35,701
ALAN R. THIELE, Reg. No. 30,694
TAMSEN VALOIR, Reg. No. 41,417
RAYMOND VAN DYKE, Reg. No. 34,746
BRIAN D. WALKER, Reg. No. 37,751
GERALD T. WELCH, Reg. No. 30,332
HAROLD N. WELLS, Reg. No. 26,044
WILLIAM D. WIESE, Reg. No. 45,217

all of the firm of **JENKENS & GILCHRIST, a Professional Corporation**, 1445 Ross Avenue, Suite 3200, Dallas, Texas 75202-2799, as my attorneys and/or agents, with full power of substitution and revocation, to prosecute this application, provisionals thereof, continuations, continuations-in-part, divisionals, appeals, reissues, substitutions, and extensions thereof and to transact all business in the United States Patent and Trademark Office connected therewith, to appoint any individuals under an associate power of attorney and to file and prosecute any international patent application filed thereon before any international authorities, and I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization who/which first sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct them in writing to the contrary.

Please address all correspondence and direct all telephone calls to:

Richard J. Moura, Esq.
Jenkens & Gilchrist, P.C.
1445 Ross Avenue, Suite 3200
Dallas, Texas 75202-2799
214/855-4500
214/855-4300 (fax)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAMED INVENTOR(S)

1	Magnus Tillgren **Full Name**	**Inventor's Signature**	**Date**
	Ö. Farmvägen 42B SE-214 41 MALMÖ, Sweden **Residence** (city, state, country)		Sweden **Citizenship**
	Ö. Farmvägen 42B SE-214 41 MALMÖ, Sweden **Post Office Address** (include zip code)		

(FOR ADDITIONAL INVENTORS, check here X and add additional sheet for inventor information regarding signature, name, date, citizenship, residence and address)

<table>
<tr><td rowspan="3">2</td><td>Magnus Hollström

Full Name</td><td>Inventor's Signature</td><td>Date</td></tr>
<tr><td colspan="3">Filippavägen 6A
SE-222 41 LUND, Sweden

Residence (city, state, country)   Sweden
Citizenship</td></tr>
<tr><td colspan="3">Filippavägen 6A
SE-222 41 LUND, Sweden

Post Office Address (include zip code)</td></tr>
</table>

3	Patrik Olsson **Full Name**	**Inventor's Signature**	**Date**
	Börringegatan 6C SE-217 72 MALMÖ, Sweden **Residence** (city, state, country)	Sweden **Citizenship**	
	Börringegatan 6C SE-217 72 MALMÖ, Sweden **Post Office Address** (include zip code)		